

Translation

PATENT COOPERATION TREATY

PCT/FR2003/003210



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BET 03P1008	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FR2003/003210	International filing date (<i>day/month/year</i>) 28 octobre 2003 (28.10.2003)	Priority date (<i>day/month/year</i>) 29 octobre 2002 (29.10.2002)
International Patent Classification (IPC) or national classification and IPC F01N 3/023, F24J 1/00		
Applicant PEUGEOT CITROEN AUTOMOBILES SA		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 23 février 2004 (23.02.2004)	Date of completion of this report 04 February 2005 (04.02.2005)
Name and mailing address of the IPEA/ Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FR2003/003210

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1-13, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages 1-15, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the drawings:
 pages 1/4-4/4, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

- These elements were available or furnished to this Authority in the following language _____ which is:
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FR 03/03210

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-12	YES
	Claims	13-15	NO
Inventive step (IS)	Claims	1-12	YES
	Claims	13-15	NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations

1. The present application relates to an exhaust line for an internal combustion engine, in particular a diesel engine, comprising a particulate filter and means for regenerating same, wherein said means increase the temperature of the particles lining the filter walls to a value higher than the combustion temperature thereof. The application also describes a method for regenerating the particulate filter.

The prior art proposes various solutions for causing the combustion of the particles collected on diesel engine filter walls (see, e.g., WO-A-0226379, US-A-2002/0139113 and US-A-5707593.

1.1. The solution proposed in the present application and claimed in independent claim 5, is not known from the available prior art. According to said solution, the claimed exhaust line comprises at least one reactor containing a first solid compound, in particular lime, and an evaporator for vaporising a second compound, in particular water, that combines with the first compound in a reversible exothermal reaction. The discharged heat is transmitted via suitable means to the particles collected on the

filter walls while causing the combustion thereof. The heat discharged by said combustion is recycled to the reactor, where a reverse reaction to the first takes place, involving heat consumption and the generation of lime and water vapour. The water vapour is extracted from the reactor, condensed and collected in a reservoir for future use.

Document US-A-5653106, which is considered the closest prior art, discloses the use of the same $\text{CaO}/\text{H}_2\text{O}/\text{Ca}(\text{OH})_2$ system in an internal combustion engine exhaust line. Said system is however used with a three-way catalyst rather than a particulate filter. In particular, the system is set in operation when the engine is cold, i.e. upon start up or in the cold season. The heat discharged by the exothermal reaction is transmitted to the catalyst and even used to heat up the air in the combustion engine.

- 1.2. The available prior art does not provide any indication that might lead a person skilled in the art to use the $\text{CaO}/\text{H}_2\text{O}/\text{Ca}(\text{OH})_2$ system described in US-A-5653106 in combination with a particulate filter in order to cause the combustion of the collected particles.

Therefore, the subject matter of claim 5 meets the requirements of PCT Article 33(2) and (3).

The same reasoning applies to independent claim 1, which defines the method for regenerating the particulate filter according to the steps described above. Therefore, the subject matter of claim 1 meets the requirements of PCT Article 33(2) and (3).

- 1.3. Dependent claims 2-4 and 6-12 relate to particular embodiments of the subject matter of claims 1 and 5 and therefore also meet the requirements of PCT Article 33(2) and (3).
2. The present set of claims also includes independent claim 13, relating to the protection of a particulate filter. This claim does not meet the requirements of the PCT, since the subject matter thereof does not comply with the criterion of novelty (PCT Article 33(2)). In fact, claim 13 uses a very general wording. It defines a particulate filter capable of being used in an internal combustion engine exhaust line, said filter including a reactor containing a first solid compound. Said compound is capable of reacting with a second compound in a reversible exothermal reaction. The feature whereby said reactor is "located outside the path of the exhaust gases" is not a structural feature of the claimed filter, but a feature relating to the positioning of the filter in the exhaust line, which is not part of the filter to be protected. This feature leads to a lack of clarity with regard to the scope of protection of the claim. In fact, it is unclear whether this is limited to the filter or the combination thereof with an exhaust line (PCT Article 6). Moreover, it is not a limiting feature with regard to the structure of the claimed filter.

The other feature mentioned in claim 13 and expressed by the phrase "in order to increase... captured by said filter" is simply a desired effect relating to the generation of heat as the result of the exothermal reaction. Such a functional feature

is not a limiting feature of the structure of the claimed filter (PCT Article 6).

A particulate filter capable of being used in an internal combustion engine exhaust line and comprising an alkaline earth metal oxide, in particular calcium oxide, is well-known to a person skilled in the art, for example from documents WO-A-0226379 and EP-A-0160482 (cf. the passages cited in the search report). Since such an oxide is clearly capable of reacting with water in an exothermal reaction, the filter disclosed in these documents anticipates the subject matter of claim 13 (PCT Article 33(2)).

The same reasoning also applies to the subject matter of dependent claims 14 and 15, which are likewise anticipated by the two documents cited above (PCT Article 33(2)).

3. The subject matter of all the claims is considered industrially applicable (PCT Article 33(4)).
4. Document US-A-5653106, which is considered the closest prior art, has not been cited in the application (PCT Rule 5.1(a)(ii)).